SERVICE MANUAL ST450L

marantz

model ST450L

Stereophonic Tuner

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ Company has created the ultimate in stereo sound. Only original MARANTZ parts can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

ORDERING PARTS

Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use MARANTZ parts order forms which are available from our National Parts Depot located at the following address:

SUPERSCOPE NATIONAL PARTS DEPARTMENT
20525 Nordhoff Street
Chatsworth, California 91311
Phone: 1-800-423-5108
1-213-998-9333

The following information must be supplied to eliminate delays in processing your order:

1. Complete address.
2. Complete part numbers.
3. Complete description of parts.
4. Model number for which part is required (indicate MARANTZ).
5. Account number (for account customers only).

Direct consumers will be provided with the current retail prive quotation on availabe parts in order to advise them of the cost of the parts and shipping.

OVERSEAS PARTS ORDERING

Parts may also be ordered from the following overseas addresses:

CANADA

Superscope Canada, Ltd.
3710 Nashua Drive
Mississauga
Ontario, Canada L4V1M5

AUSTRALIA

Superscope (Australasia) Pty., Ltd.
32 Cross Street (P.O.Box 604)
Brookvale 2100 N.S.W.
Australia

JAPAN

Marantz Japan, Inc.
3622 Kamitsuruma
Sagamihara Shi
Kanagawa, Japan

EUROPE

Superscope Europe, S.A.
Avenue Leopold III, 2
7120 Peronnes-Lez-Binche
Belgium

Marantz France
Rue Louis Armand 9
92600 Asnieres
Hauts-de-Seine
France

Marantz Audio U.K. Ltd.
London Road, 203
Staines
Middlesex
England

Superscope GmbH
Max-Planck-Strass 22
D-6072 Dreieich
West Germany

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

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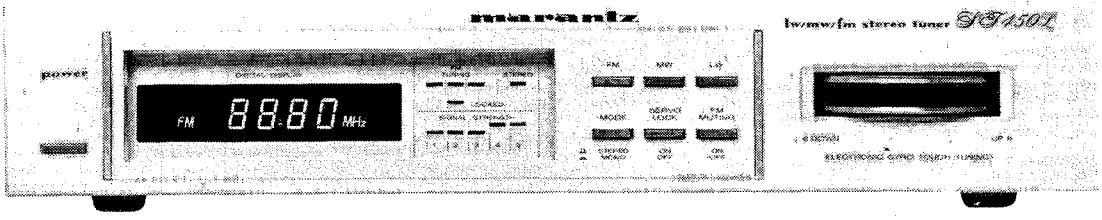
TABLE OF CONTENTS

SECTION		PAGE
1.	INTRODUCTION	1
2.	P.W. BOARDS	1
3.	TEST EQUIPMENT REQUIRED FOR SERVICING	2
4.	BLOCK DIAGRAM	2
5.	ALIGNMENT PROCECURES	3
5.1	FM Alignment Procedures (Function switch in the "FM" position)	3
5.2	Muting Circuit Alignment	3
5.3	Multiplex Alignment Procedures (Function switch in the "FM" position)	3
5.4	AM Alignment Procedures (Function switch in the "AM" position)	3
5.5	Frequency Display Alignment Procedures	5
6.	VOLTAGE CONVERSION	5
7.	DIAGRAM AND COMPONENT LOCATIONS	6
7.1	Tuner Assembly (P100) Schematic Diagram and Component Locations	6
7.2	Frequency Indicator Assembly (PQ00), Sub Assembly (PC00) Schematic Diagram and Component Locations	8
7.3	Switch Assembly (PS00) Schematic Diagram and Component Locations	9
7.4	Power Switch Assembly (PU00) Schematic Diagram and Component Locations	9
7.5	LED Indicator Assembly (PX00) Schematic Diagram and Component Locations	9
7.6	Ant. Coil Assembly (PB00) Schematic Diagram and Component Locations	9
8.	EXPLODED VIEW AND PARTS LIST	10
9.	ELECTRICAL PARTS LIST	16
10.	TECHNICAL SPECIFICATIONS	21
11.	SCHEMATIC DIAGRAMS	22

MODEL ST450L LW/MW/FM STEREOPHONIC TUNER



1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model ST-450L LW/MW/FM Stereophonic Tuner.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of the operations in the Tuner.

The parts list furnishes information by which replacement parts may be ordered from the Marantz Company. A simple description is included for parts which can usually be obtained through local suppliers.

2. P.W. BOARDS

As can be seen from the circuit diagram, the chassis of Model ST450L consists of the following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

1. Tuner . . . . . .mounted on P.W. Board P1O0
2. Frequency Indicator . . . mounted on P.W. Board P0O0
3. Switch. . . . . .mounted on P.W. Board PSO0
4. Power Switch . . . . . mounted on P.W. Board PUO0
5. LED Indicator . . . . . mounted on P.W. Board PXO0
6. ANT Coil . . . . . mounted on P.W. Board PBO0

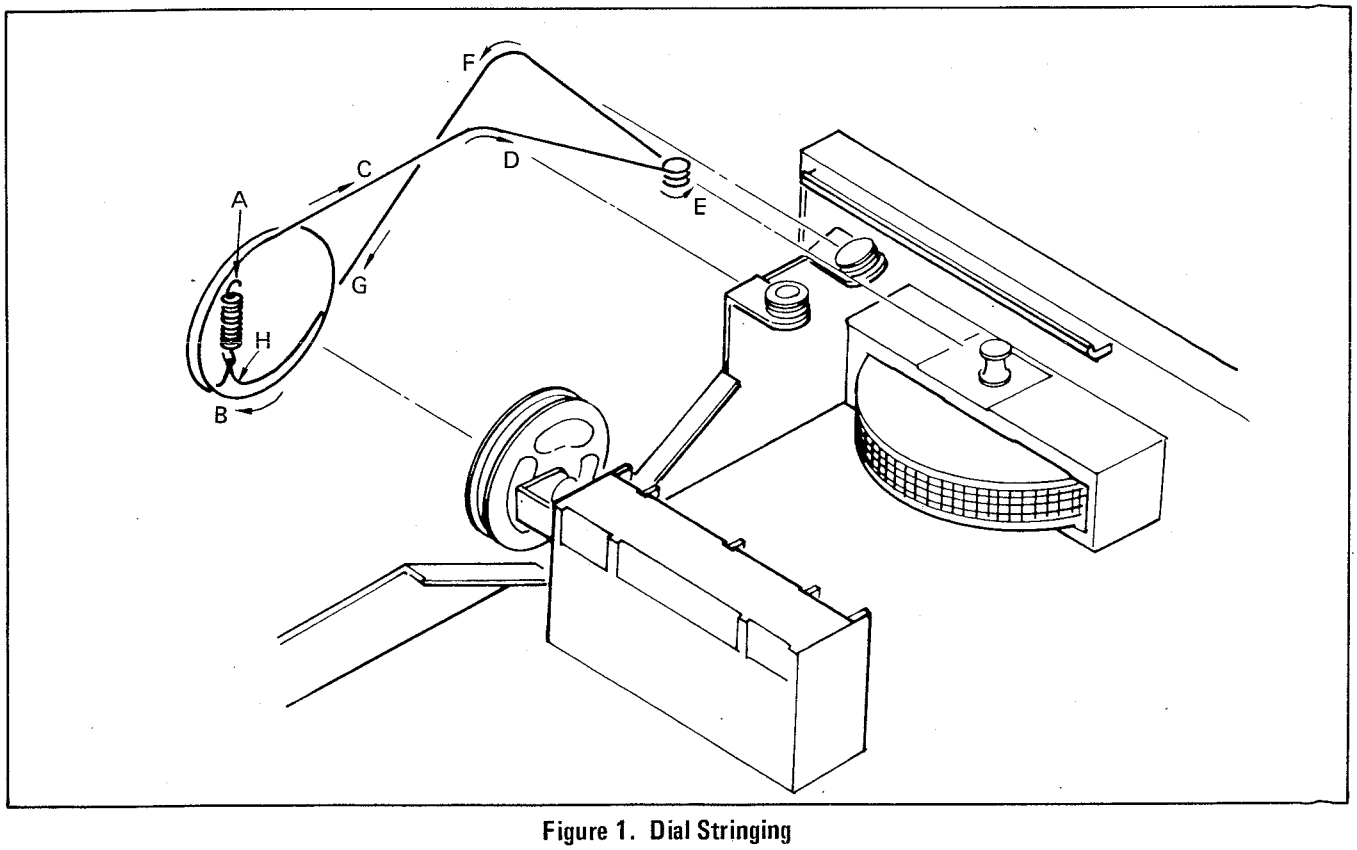


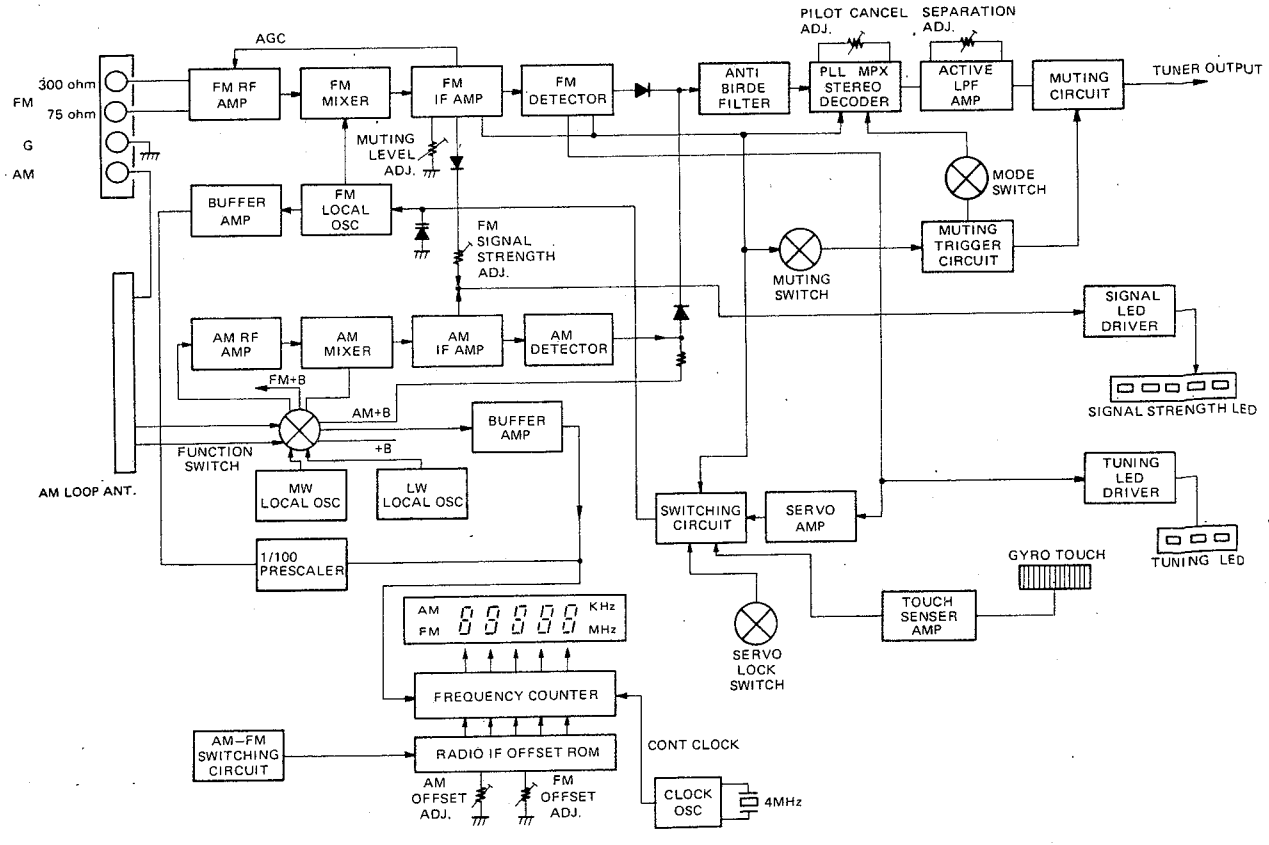
Figure 1. Dial Stringing

3. TEST EQUIPMENT REQUIRED FOR SERVICING

This table lists the test equipment required for servicing the Model ST450L Tuner.

Item	Manufacturer and Model No.	Use
AM Signal Generator		Signal source for AM Alignment
Test Loop		Use with AM Signal Generator
FM Signal Generator MPX Signal Generator	Sound Technology Model 1000A	Signal source for FM alignment Stereo separation alignment and trouble shooting
Distortion Analyzer Audio Oscillator AC VTVM	Sound Technology Model 1700A	Distortion measurements Sinewave and squarewave signal source Voltage measurements (AC)
Oscilloscope	Tektronix Model T932 Philips Model 3232	Waveform analysis and trouble shooting
Frequency Counter		MPX Oscillator adjustment (VCO) Frequency display alignment
Circuit Tester		Trouble shooting
DC VTVM	Fluke Model 8000 "Digital" Simpson Model 313, Triplet Model 801	Voltage measurements (DC)
AC Wattmeter	Simpson Model 1379	Monitors primary power to tuner
Line Voltmeter	Simpson Model 1359	Monitors potential of primary power to tuner
Variable Autotransformer	Superior Electronic Co., Powerstat Model 116B-10A	Adjusts level of primary power to tuner

4. BLOCK DIAGRAM



5. ALIGNMENT PROCEDURES

A dummy resistor of 47 k-ohms must be connected across the tuner output terminals before alignment.

5.1 FM Alignment Procedures (Function switch in the "FM" position)

FM RF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	RF generator to FM antenna terminals through matching network (300 ohms, balanced) (Maintain RF level below limit.)	87.4 MHz	VTVM to L or R channel output (W002)	Tuning capacitor minimum closed.	L107 for maximum output.
2		108.2 MHz		Tuning capacitor maximum open.	C116 for maximum output.
3		90 MHz		90 MHz	L101, L103, L104 for maximum output.
4		106 MHz		106 MHz	ANT. RF. TRIM. CAP. for maximum output.
5	Repeat steps 1 to 4.				
6	Check overall response curve and repeat above steps as necessary to obtain maximum sensitivity.				
7	No connection	No signal	"0" center meter or DC current meter in 100μA range between J201 and J202		L201 primary core so that the meter indicates its center or may read "0".
8	RF generator 1mV (or 300μV, only Step 10) output to FM antenna terminals through matching network. (300 ohms, balanced)	98 MHz	Distortion meter to L or R channel output (W002)	98 MHz	L201 Secondary core (BLK) for minimum distortion.
9					
10		98 MHz		98 MHz	R224 so that signal strength Led may light 5 points.

5.2 Muting Circuit Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	RF generator 12.5μV output to FM antenna terminals through matching network (300 ohms, balanced)	98 MHz	VTVM to R or L channel output (W002)	98 MHz	R220 for 12.5μV threshold level. (During this adjustment turn the muting pushswitch "ON".)

5.3 Multiplex Alignment Procedures (Function switch in the "FM" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	RF generator to FM antenna terminals through matching network (300 ohms, balanced), with 1mV FM stereo simulator RF level and 100% modulation (pilot 9%)	No Modulation	Frequency counter to J301	98 MHz	R303 so that Frequency counter may precisely read 76 kHz
2		Stereo, left (1,000 Hz)	VTVM to right channel output (W002, red)		R319 for maximum output and same separation in both channels.
3		Stereo, right (1,000 Hz)	VTVM to left channel output (W002, white)		
4	Repeat steps 2 and 3.				

5.4 AM Alignment Procedures

1. MW IF Alignment (Function switch in the "MW" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set Dial Pointer to:	Adjust:
1	Sweep generator to OSC Variable Cap.	455 kHz marker	Oscilloscope to JA06	Quiet point on band	LA02 & LA03 for maximum and symmetric response.

2. MW RF Alignment (Function switch in the "MW" position)

Step	Signal Source	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Apply the signal to the AM Loop antenna from the RF generator, using the test loop, as per the Figure 2.	525 kHz	VTVM to L or R channel output (W002)	Tuning capacitor minimum closed.	LS01 for maximum output.
2		1,630 kHz		Tuning capacitor maximum open.	CS07-1 for maximum output.
3		600 kHz		600 kHz	LB01 for maximum output.
4		1,400 kHz		1,400 kHz	CS02-1 for maximum maximum output.
5	Repeat steps 1 to 4 as necessary to obtain maximum sensitivity.				

3. LW RF Alignment (Function switch in the "LW" position)

Step	Signal Source	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Apply the signal to the AM Loop antenna from the RF generator, using the test loop, as per the Figure 2.	145 kHz	VTVM to L or R channel output (W002)	Tuning capacitor minimum closed.	LS02 for maximum output.
2		380 kHz		Tuning capacitor maximum open.	CS07--1 for maximum maximum output.
3		170 kHz		170 kHz	LB02 for maximum output.
4		350 kHz		350 kHz	CSO2-2 for maximum maximum output.
5	Repeat steps 1 to 4 as necessary to obtain maximum sensitivity.				

4. IF TRAP Alignment (Function switch in the "LW" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set Tuning	Adjust:
1	Apply the signal to the AM Loop antenna from the RF generator, using the test loop, as per the Figure 2.	455 kHz	VTVM to L or R channel output (W002)	350 kHz	LA04 for minimum output.

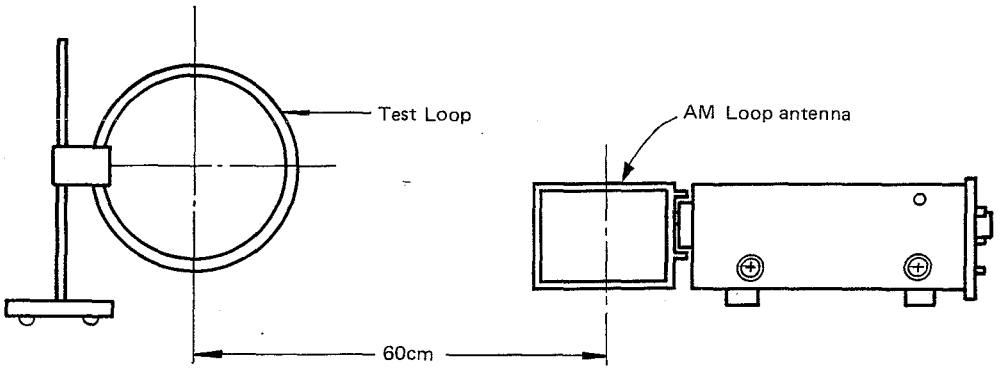


Figure 2. Application of AM Signal

5.5 Frequency Display Alignment Procedures

1. FM Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set Tuning		Adjust:
1	RF generator 1mV output to FM antenna teminals through matching network. (300 ohm, balanced)	98.025 MHz	"O" center meter or DC current meter in 100μA range between J201 and J202	98.025 MHz	Meter indicates its center or may read "O"	R002 so that the flicker of 98.00/98.05 MHz can be occurred on the Digital Readout Freq. display.

2. MW Alignment

1	Apply the signal to the AM Loop Antenna from the RF generator using the test loop. As per the Figure 2.(with 5mV/m) (modulation 5kHz 30%)	600.5 kHz	VTVM to R or L channel output (W002)	600.5 kHz Tune precisely to dip point of 5 kHz output	RQ01 so that the flicker of 600/601 kHz can be occurred on the Digital Readout Freq. display.

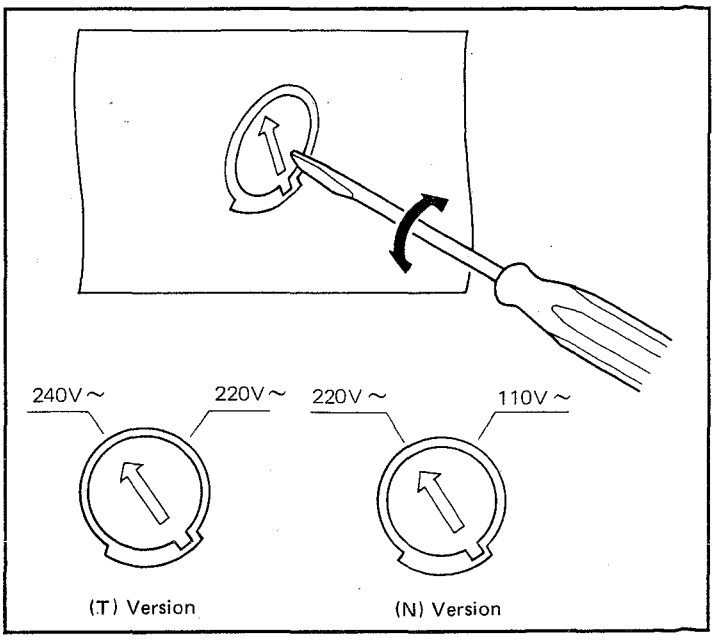
6. VOLTAGE CONVERSION

• EUROPEAN MODEL ONLY

To convert the unit to a different power source voltage, change the position as illustrated in the drawing below.

CAUTION
DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE. DO NOT DISASSEMBLE THE VOLTAGE SELECTOR ABSOLUTELY.

Voltage Conversion Chart



NOTE ON SAFETY:

THE PARTS MARKED WITH ⚠ ARE IMPORTANT PARTS ON THE SAFETY.
PLEASE USE THE PARTS HAVING THE DESIGNATED PARTS NUMBERS WITHOUT FAIL.

FTZ REGULATION

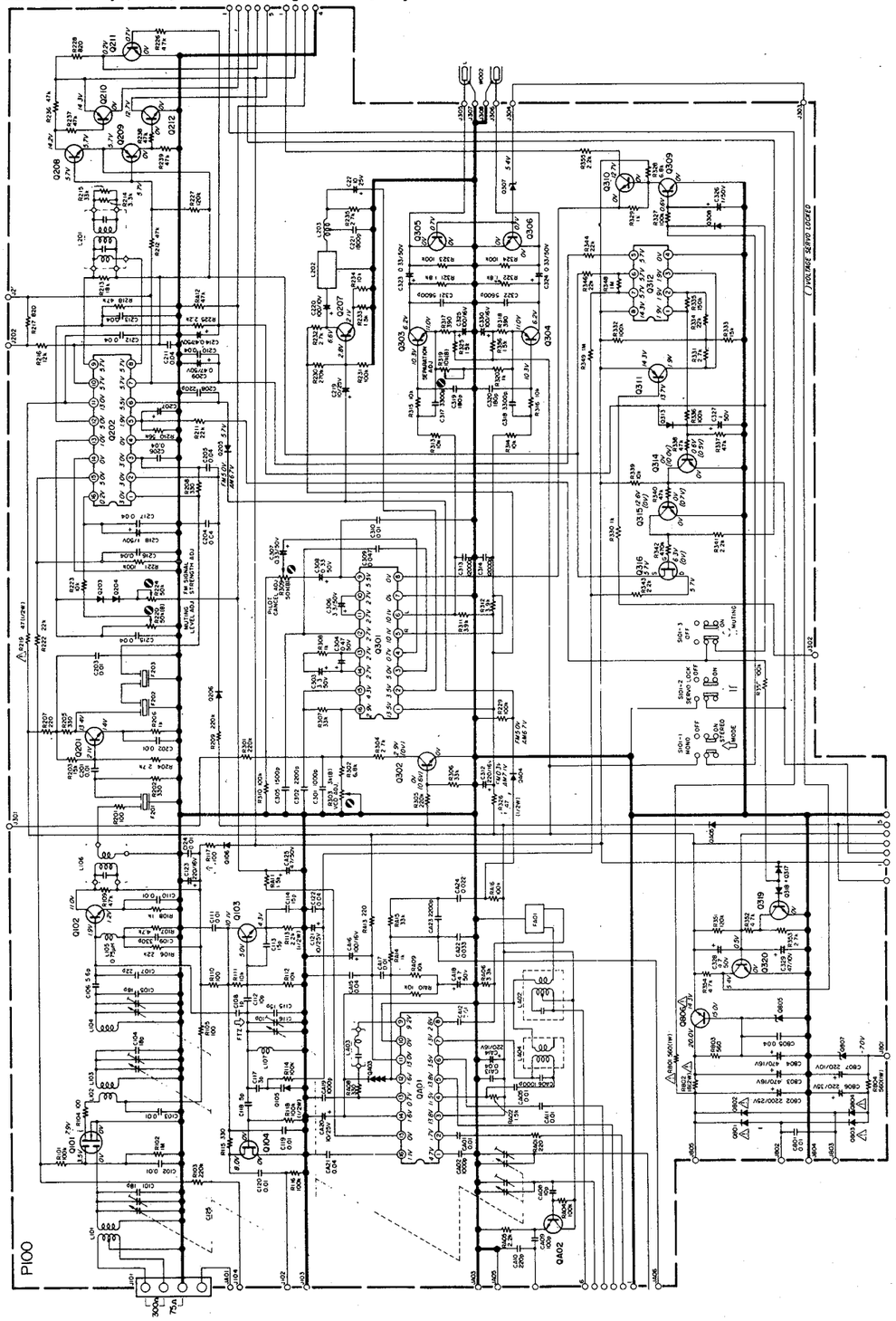
Instruction for the use in the range other than specified in FTZ codes.

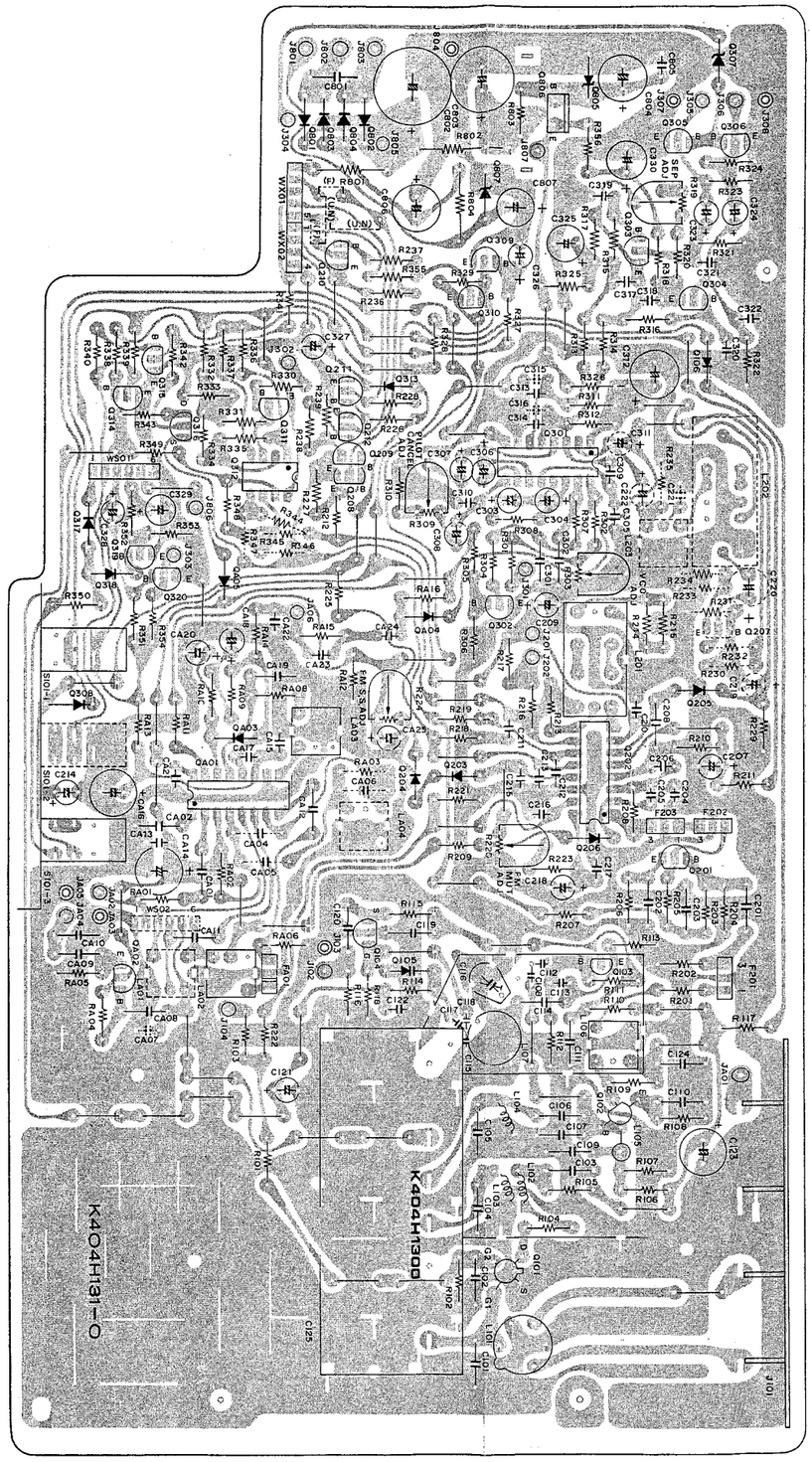
Achtung für die Leute, die in dem Gebiet wohnen, wo die FTZ-Bestimmungen vorherrschend sind.

Sollte des Gerät auch für Frequenzen auszerhalb des in den FTZ-Bestimmungen angegebenen Bereiches empfangebereit sein, bitten wir, den Bereich durch Nachstellen des Kernes in der Oszillatorspule (in der Abbildung mit "FTZ" gekennzeichnet) so zu korrigieren, dass er den Bestimmungen entspricht.

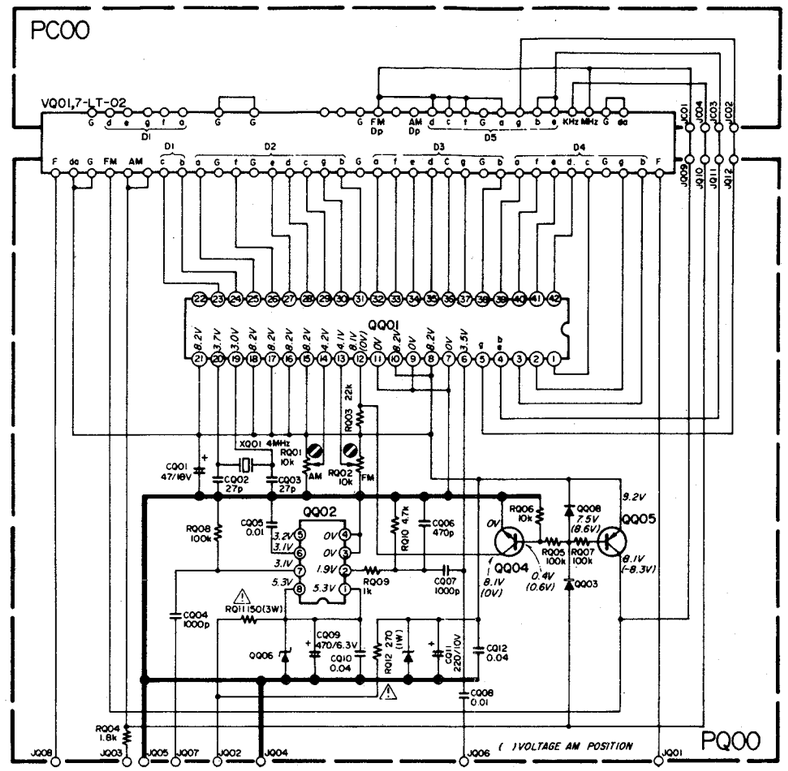
7. DIAGRAM AND COMPONENT LOCATIONS

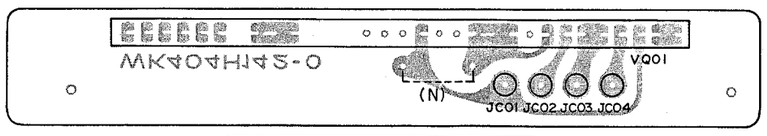
7.1 Tuner Assembly (P100) Schematic Diagram and Component Locations

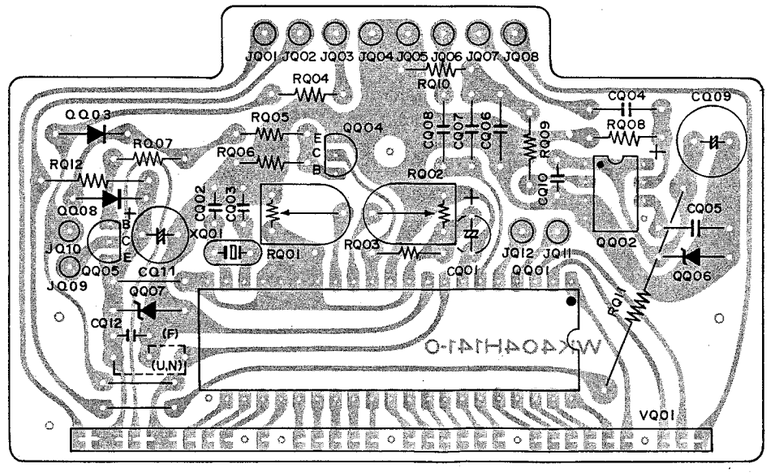




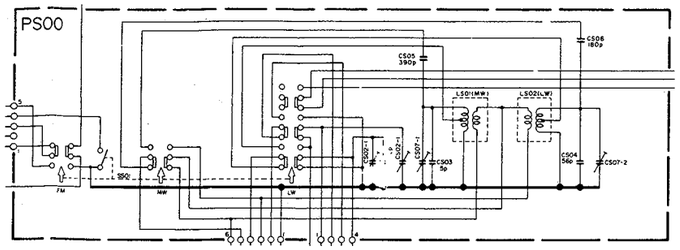
7.2 Frequency Indicator Assembly (PQ00), Sub Assembly (PC00) Schematic Diagram and Component Locations

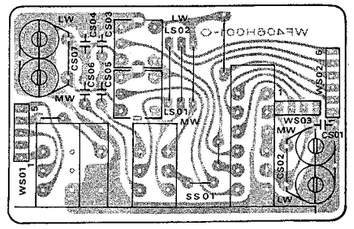




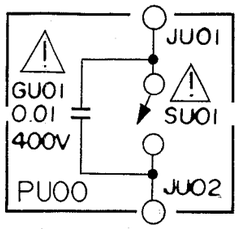


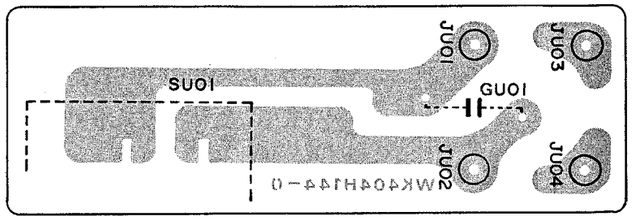
7.3 Switch Assembly (PS00) Schematic Diagram and Component Locations



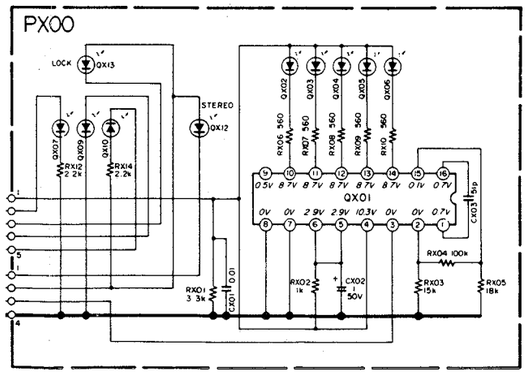


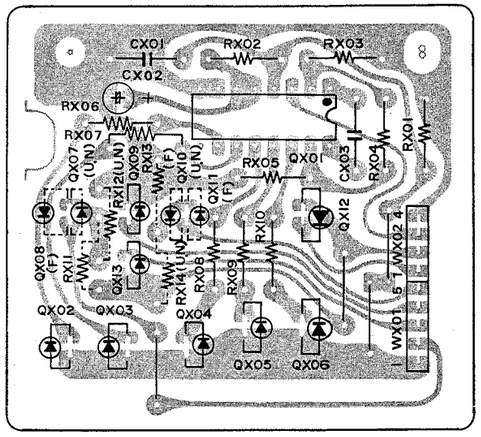
7.4 Power Switch Assembly (PU00) Schematic Diagram and Component Locations



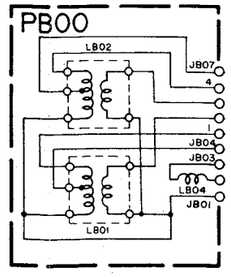


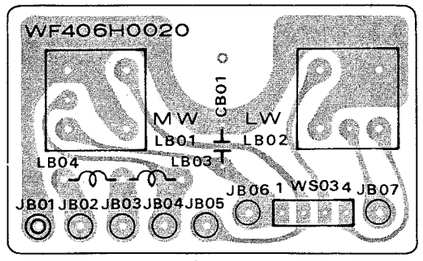
7.5 LED Indicator Assembly (PX00) Schematic Diagram and Component Locations





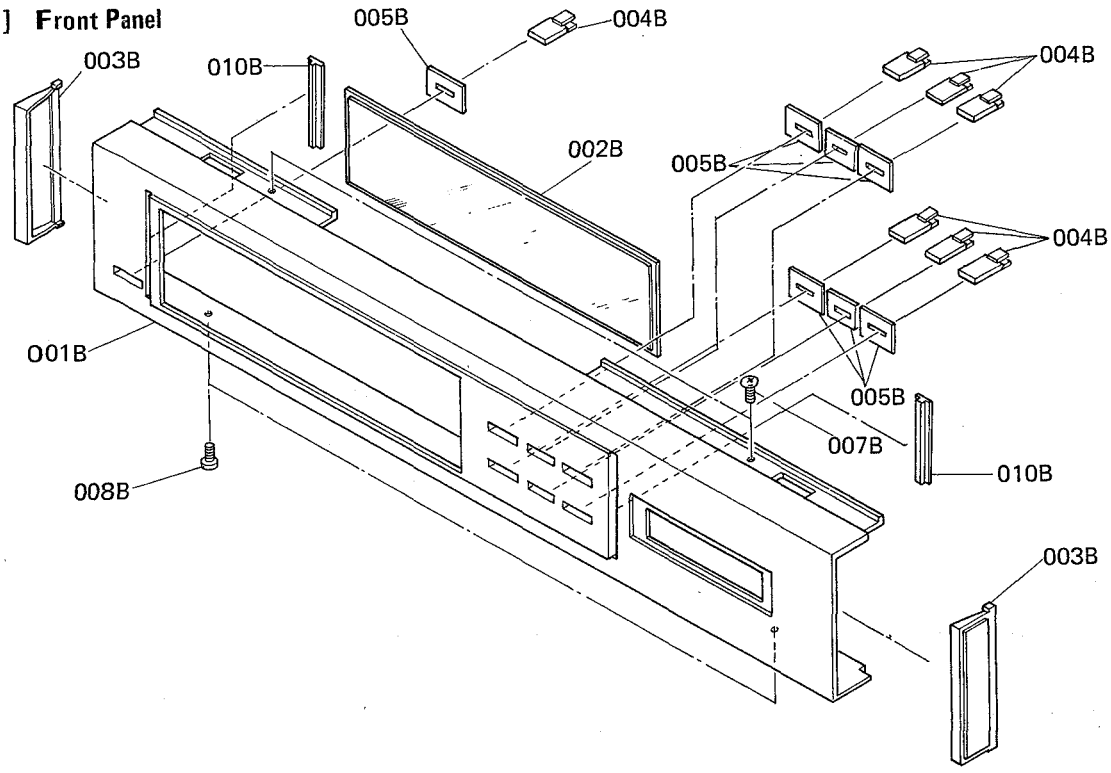
7.6 Ant. Coil Assembly (PB00) Schematic Diagram and Component Locations





8. EXPLODED VIEW AND PARTS LIST

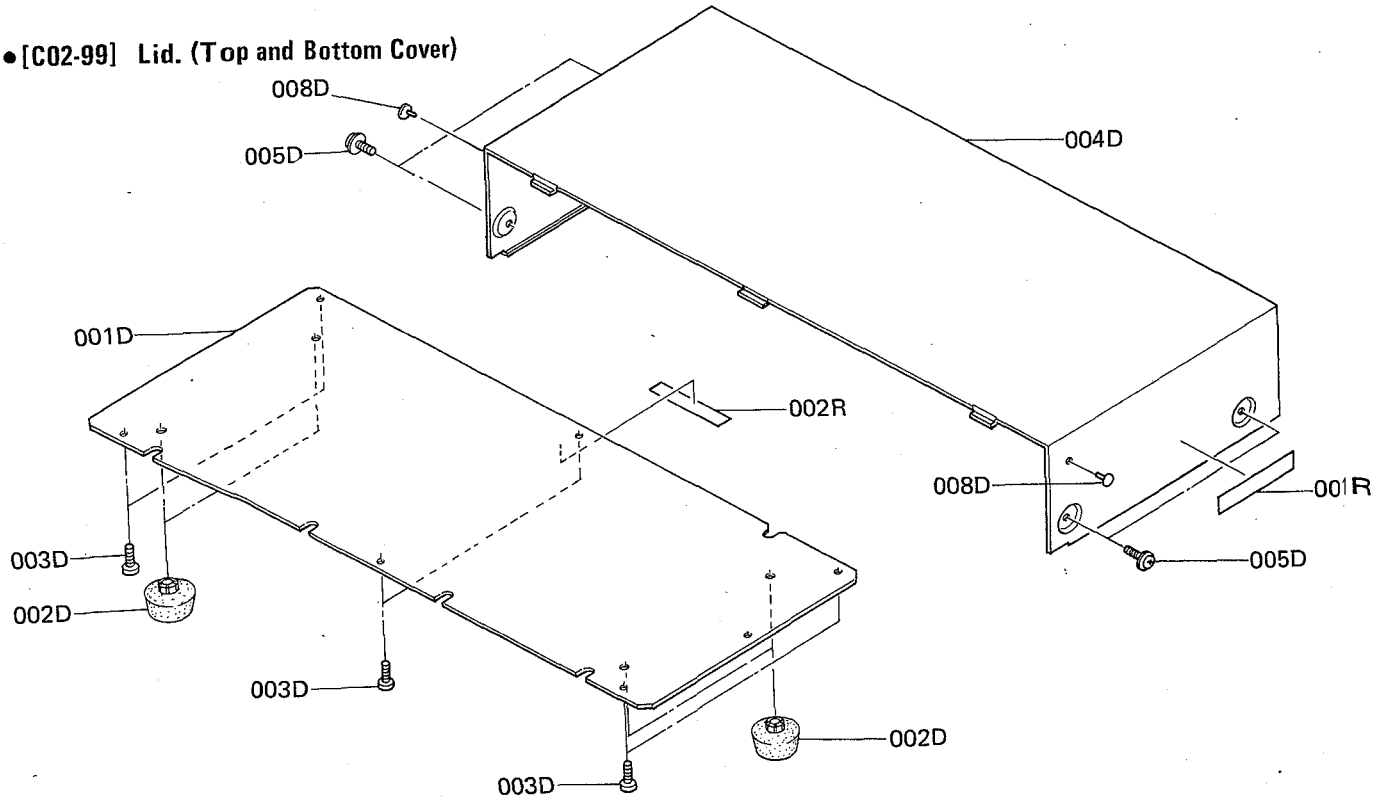
● **[C01-99] Front Panel**



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
A	1	406H063400	Front Panel Assembly
001B	1	406H063010	Escutcheon
002B	1	404H158010	Window
003B	2	403H067010	Cap
004B	7	208H154020	Knob
005B	7	208H259010	Bushing
010B	2	403H063020	Escutcheon

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
007B	2	51280308B0	B.H.Tapped Screw B3x8
008B	2	51280308B0	B.H.Tapped Screw B3x8

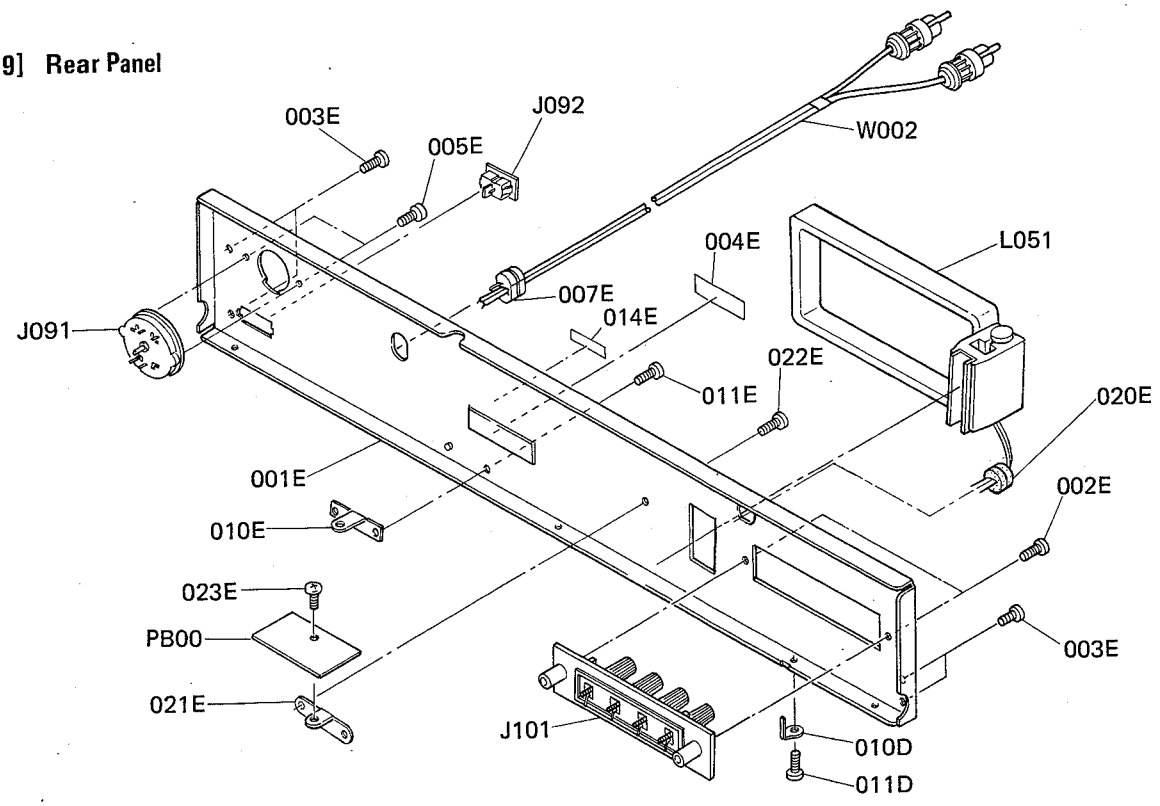
• [C02-99] Lid. (Top and Bottom Cover)



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001D	1	403H257020	Lid. Bottom Cover
002D	4	403H057010	Leg
003D	6	51280308B0	B.H.Tapped Screw B3x8
004D	1	403H257010	Lid. Top Cover
005D	4	51260408Z0	B.T. Screw B4x8
008D	2	2991259010	Bushing

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001R	1	2932861010	Label
002R	1	2578861010	Label

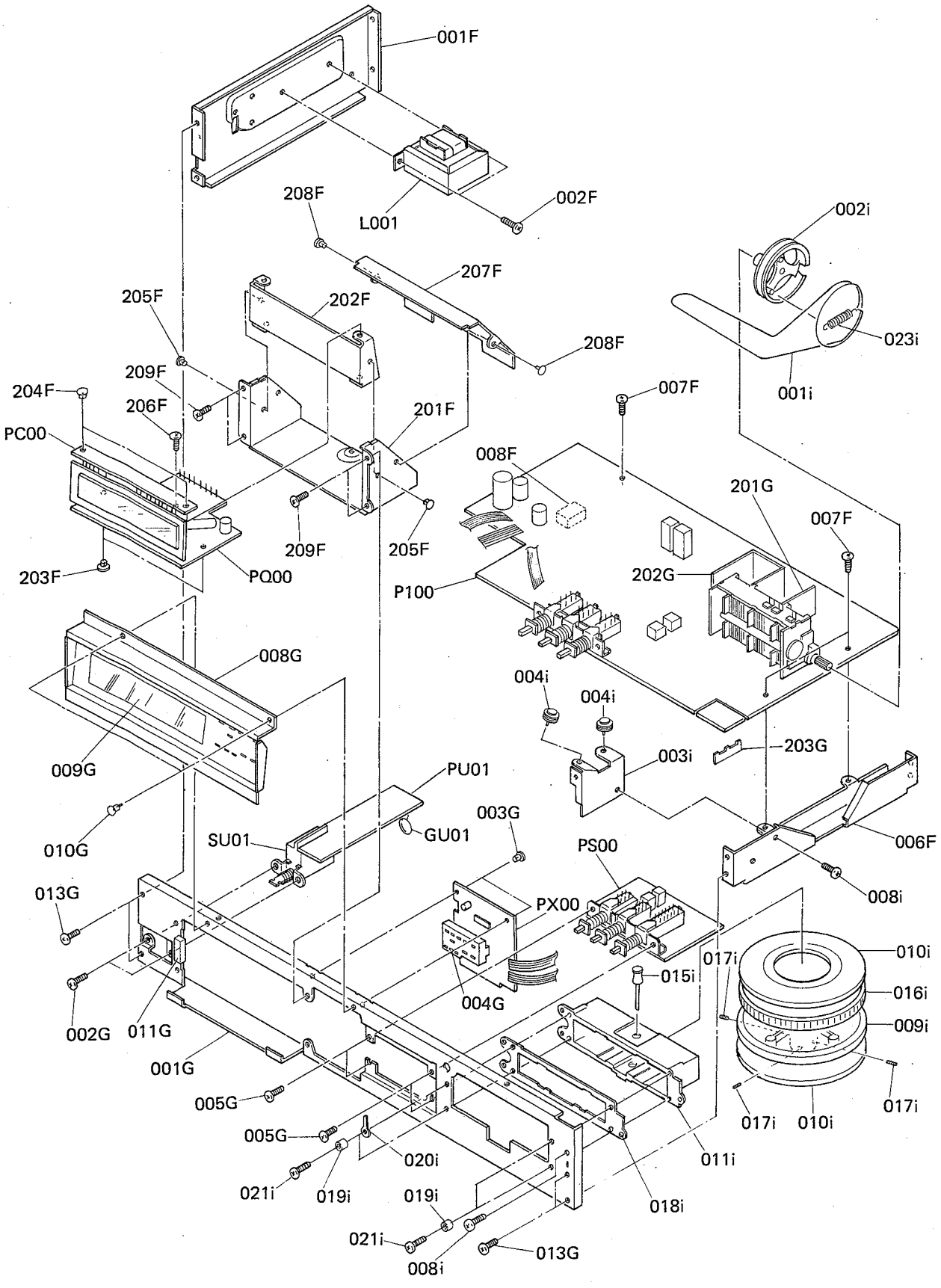
• [CO3-99] Rear Panel



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
010D	1	404H123010	Contactor
011D	1	51280308B0	B.H.Tapped Screw B3x8
001E	1	406H160210	Bracket, Rear Panel
002E	2	51280308U0	B.H.Tapped Screw B3x8
003E	4	51280308U0	B.H.Tapped Screw B3x8
004E	1	2112265010	Indicator
005E	2	51280310U0	B.H.Tapped Screw B3x10
007E	1	1455259090	Bushing
010E	1	404H160030	Bracket
011E	1	51280308U0	B.H.Tapped Screw B3x8
014E	1	4581861010	Label
020E	1	1455259010	AM Loop ANT Read
021E	1	404H160030	Bracket
022E	1	51280308U0	B.H.Tapped Screw B3x8
023E	1	51280308U0	B.H.Tapped Screw B3x8

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
⚠ J091	1	BY05060040	Voltage Selector
⚠ J092	1	YP04000580	Plug, AC Inlet
J101	1	YT01040220	Ant. Terminal
L051	1	LA00015010	AM Loop Ant.
W002	1	YB01000300	Connective Cord

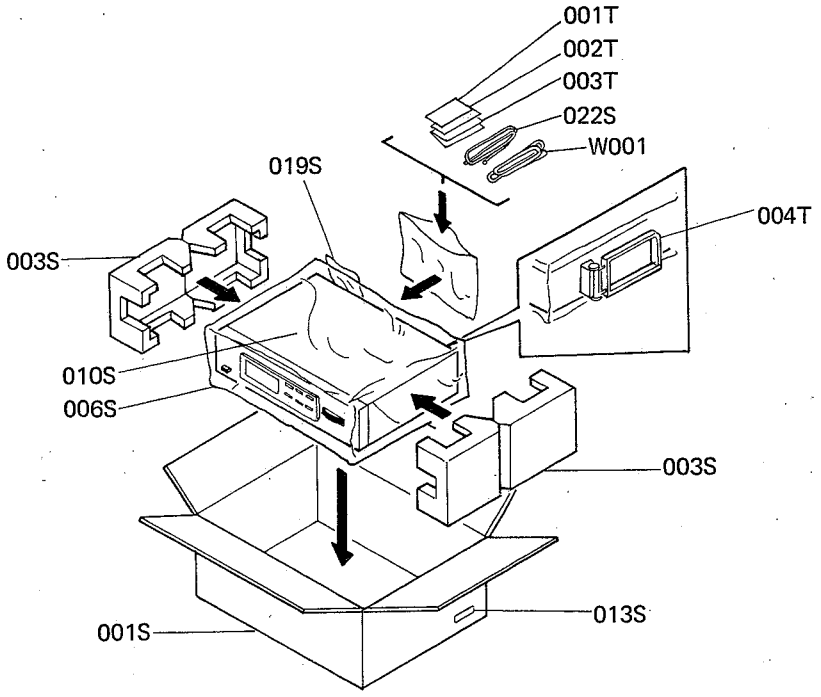
• [P02-99] Front Chassis and General Parts



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001F	1	404H126010	Stay
002F	2	61280406B0	B.H.Tapped Screw B4x6
006F	1	404H126020	Stay
007F	3	51260308B0	B.T. Screw B3x8
008F	1	404H056010	Buffer
201F	1	404H109010	Shield
202F	1	404H109030	Shield
203F	2	2912259020	Bushing
204F	2	2912259020	Bushing
205F	2	2912259020	Bushing
206F	1	51280308B0	B.H.Tapped Screw B3x8
207F	1	404H109020	Shield
208F	2	2912259020	Bushing
209F	4	51280308B0	B.H.Tapped Screw B3x8
001G	1	404H160010	Bracket, Front Chassis
002G	2	51100306A9	B.H.M. Screw B3x6
003G	2	2276005060	Clamper
004G	1	404H259010	Bushing
005G	4	51100306A9	B.H.M. Screw B3x6
008G	1	404H302010	Dial
009G	1	2137158020	Window
011G	1	3940118010	Bushing
010G	2	2912259020	Bushing
013G	4	51280308B0	B.H.Tapped Screw B3x8
201G	1	2259109040	Shield
202G	1	2259109050	Shield
203G	1	2259109060	Shield

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001i	60	72040805A0	String
002i	1	2116159010	Drum
003i	1	404H160020	Bracket
004i	2	2276262500	Pulley
008i	2	51280308B0	B.H.Tapped Screw B3x8
009i	1	2219273010	Flywheel
010i	2	2219063230	Escutcheon
011i	1	2112104500	Retainer
015i	1	2219112010	Shaft
016i	1	2286353010	Ring
017i	3	51690306Q9	Socket Screw
018i	1	2286120010	Insulator
019i	4	2219259030	Bushing
020i	1	62030049W0	Lug
021i	4	51280310B0	B.H.Tapped Screw B3x10
023i	1	2112115020	Spring
⚠L001	1	TS14808330	Power Transformer
⚠GU01	1	DK18103840	Ceramic 0.01μF
⚠SU01	1	SP01010390	Push Switch

• [H01-99] Packing Materials



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001S	1	406H801010	Packing Case
003S	2	001H809010	Cushion
006S	1	9090909040	Polyethylene Sheet
010S	1	2918107360	Sheet
013S	2	9526019060	Serial No. Card
015S	1	2819056020	Buffer
019S	1	2731821010	Silicagel
022S	1	ZA02000070	Ext. Antenna

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001T	1	403H851310	Instructions
002T	1	406H851320	Instructions
003T	1	406H856010	Circuit Diagram
004T	1	2864804010	Sleeve
⚠W001	1	ZC01805010	A.C. Power Cord

9. ELECTRICAL PARTS LIST

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P100-TUNER CIRCUIT BOARD
P100	1	WK404H1310	P.W. Board, Tuner
	1	ZZ404H7310	P.W. Board Assembly
			P100-CAPACITORS
C101	1	DA15180010	Ceramic 18pF ±5%
C102	1	DA17103010	Ceramic 0.01μF ±20%
C103	1	DA17103010	Ceramic 0.01μF ±20%
C104	1	DA15180010	Ceramic 18pF ±5%
C105	1	DA15180010	Ceramic 18pF ±5%
C106	1	DA16056010	Ceramic 5.6pF ±10%
C107	1	DA15220010	Ceramic 22pF ±5%
C108	1	DD10010300	Ceramic 1pF ±0.25pF
C109	1	DA16331010	Ceramic 330pF ±10%
C110	1	DA17103010	Ceramic 0.01μF ±20%
C111	1	DA17103010	Ceramic 0.01μF ±20%
C112	1	DD11100300	Ceramic 10pF ±0.5pF
C113	1	DD15150300	Ceramic 15pF ±5%
C114	1	DA15150020	Ceramic 15pF ±5%
C115	1	DD15150340	Ceramic 15pF ±5%
C116	1	CT11000010	Trimming 10pF
C117	1	DD10030300	Ceramic 3pF ±0.25pF
C118	1	DD10050300	Ceramic 5pF ±0.25pF
C119	1	DA17103010	Ceramic 0.01μF ±20%
C120	1	DA17103010	Ceramic 0.01μF ±20%
C121	1	EA10602530	Elect 10μF 25V
C122	1	DK18403320	Ceramic 0.04μF
C123	1	EA22701630	Elect 220μF 16V
C124	1	DA17103010	Ceramic 0.01μF ±20%
C125	1	CA42300010	Variable
C201	1	DA17103010	Ceramic 0.01μF ±20%
C202	1	DA17103010	Ceramic 0.01μF ±20%
C203	1	DA17103010	Ceramic 0.01μF ±20%
C204	1	DK18403320	Ceramic 0.04μF
C205	1	DK18403320	Ceramic 0.04μF
C206	1	DK18403320	Ceramic 0.04μF
C207	1	EA47505030	Elect 4.7μF 50V
C208	1	DA16221010	Ceramic 220pF ±10%
C209	1	EA47405030	Elect 0.47μF 50V
C210	1	DK18403320	Ceramic 0.04μF
C211	1	DK18403320	Ceramic 0.04μF
C212	1	DK18403320	Ceramic 0.04μF
C213	1	DK18403320	Ceramic 0.04μF
C214	1	EA47405030	Elect 0.47μF 50V
C215	1	DK18403320	Ceramic 0.04μF
C216	1	DK18403320	Ceramic 0.04μF
C217	1	DK18403320	Ceramic 0.04μF
C218	1	EA10505030	Elect 1μF 50V
C219	1	EA10602530	Elect 10μF 25V
C220	1	EA10701030	Elect 100μF 10V
C221	1	DF15182300	Film 1800pF ±5%
C222	1	EA10602530	Elect 10μF 25V
C301	1	DF55102090	Film 1000pF ±5%
C302	1	DF15222300	Film 2200pF ±5%
C303	1	EA33505030	Elect 3.3μF 50V

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
C304	1	EA47405030	Elect 0.47μF 50V
C305	1	DF15152300	Film 1500pF ±5%
C306	1	EA33505030	Elect 0.33μF 50V
C307	1	EA33405030	Elect 0.33μF 50V
C308	1	EA33405030	Elect 0.33μF 50V
C309	1	DF15473300	Film 0.047μF ±5%
C310	1	DF15103300	Film 0.01μF ±5%
C312	1	EA22701630	Elect 220μF 16V
C313	1	DF15123300	Film 0.023μF ±5%
C314	1	DF15123300	Film 0.023μF ±5%
C317	1	DF15332300	Film 3300pF ±5%
C318	1	DF15332300	Film 3300pF ±5%
C319	1	DD15181370	Ceramic 180pF ±5%
C320	1	DD15181370	Ceramic 180pF ±5%
C321	1	DF15562300	Film 5600pF ±5%
C322	1	DF15562300	Film 5600pF ±5%
C323	1	EA33405030	Elect 0.33μF 50V
C324	1	EA33405030	Elect 0.33μF 50V
C325	1	EA10701630	Elect 100μF 16V
C326	1	EA10505030	Elect 1μF 50V
C327	1	EA10505030	Elect 1μF 50V
C328	1	EA47505030	Elect 4.7μF 50V
C329	1	EA47601030	Elect 47μF 10V
C330	1	EA10701630	Elect 100μF 16V
C801	1	DK18103560	Ceramic 0.01μF
C802	1	EA22802530	Elect 2200μF 25V
C803	1	EA47702530	Elect 470μF 25V
C804	1	EA47701630	Elect 470μF 16V
C805	1	DK18403320	Ceramic 0.04μF
C806	1	EA22703530	Elect 220μF 35V
C807	1	EA22701030	Elect 220μF 10V
CA01	1	DA17103010	Ceramic 0.01μF ±20%
CA02	1	DA17102010	Ceramic 1000pF ±20%
CA05	1	DA17103010	Ceramic 0.01μF ±20%
CA06	1	DA17102010	Ceramic 1000pF ±20%
CA08	1	DA15100020	Ceramic 10pF ±5%
CA09	1	DA15101010	Ceramic 100pF ±5%
CA10	1	DA16221010	Ceramic 220pF ±10%
CA11	1	DA17103010	Ceramic 0.01μF ±20%
CA12	1	DA17103010	Ceramic 0.01μF ±20%
CA13	1	DK18403320	Ceramic 0.04μF
CA14	1	EA22701630	Elect 220μF 16V
CA15	1	DK18403320	Ceramic 0.04μF
CA16	1	EA10701630	Elect 100μF 16V
CA17	1	DK18103320	Ceramic 0.01μF
CA18	1	EA47505030	Elect 4.7μF 50V
CA19	1	DA17102010	Ceramic 1000pF ±20%
CA20	1	EA10602530	Elect 10μF 25V
CA21	1	DK18403320	Ceramic 0.04μF
CA22	1	DK18333310	Ceramic 0.033μF
CA23	1	DF15222300	Ceramic 2200pF ±5%
CA24	1	DF15223300	Ceramic 0.022μF ±5%
CA25	1	EA47505030	Elect 4.7μF 50V

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P100-RESISTORS
			(All Resistors are ±5% and 1/4W)
R101	1	GD05104140	100kΩ
R102	1	GD05105140	1MΩ
R103	1	GD05224140	220kΩ
R104	1	GD05101140	100Ω
R105	1	GD05101140	100Ω
R106	1	GD05223140	22kΩ
R107	1	GD05472140	4.7kΩ
R108	1	GD05102140	1kΩ
R109	1	GD05473140	47kΩ
R110	1	GD05101140	100kΩ
R111	1	GD05103140	10kΩ
R112	1	GD05103140	10kΩ
R113	1	GD05222140	2.2kΩ
R114	1	GD05104140	100kΩ
R115	1	GD05331140	330Ω
R116	1	GD05104140	100kΩ
R117	1	GG05101140	100Ω
R118	1	GD05104140	100kΩ
R201	1	GD05101140	100Ω
R202	1	GD05331140	330Ω
R203	1	GD05153140	1.5kΩ
R204	1	GD05272140	2.7kΩ
R205	1	GD05331140	330Ω
R206	1	GD05102140	1kΩ
R207	1	GD05221140	220Ω
R208	1	GD05331140	330Ω
R209	1	GD05224140	220kΩ
R210	1	GD05563140	56kΩ
R211	1	GD05223140	22kΩ
R212	1	GD05473140	47kΩ
R213	1	GD05183140	18kΩ
R214	1	GD05332140	3.3kΩ
R215	1	GD05333140	33kΩ
R216	1	GD05123140	12kΩ
R217	1	GD05821140	820Ω
R218	1	GD05473140	47kΩ
R219	1	GG05470120	47Ω 1/2W
R220	1	RA05030090	Trimming 50kΩ
R221	1	GD05104140	100kΩ
R222	1	GD05223140	22kΩ
R223	1	GD05103140	10kΩ
R224	1	RA05030090	Trimming 50kΩ
R225	1	GD05222140	2.2kΩ
R226	1	GD05472140	4.7kΩ
R227	1	GD05124140	120kΩ
R228	1	GD05821140	820Ω
R229	1	GD05104140	100kΩ
R230	1	GD05274140	270kΩ
R231	1	GD05104140	100kΩ
R232	1	GD05272140	2.7kΩ

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
R233	1	GD05152140	1.5kΩ
R234	1	GD05103140	10kΩ
R235	1	GD05272140	2.7kΩ
R236	1	GD05473140	47kΩ
R237	1	GD05473140	47kΩ
R238	1	GD05473140	47kΩ
R239	1	GD05473140	47kΩ
R301	1	GD05224140	220kΩ
R302	1	GD05682140	6.8kΩ
R303	1	RA03020030	Trimming 3kΩ
R304	1	GD05272140	2.7kΩ
R305	1	GD05224140	220kΩ
R306	1	GD05333140	33kΩ
R307	1	GD05333140	33kΩ
R308	1	GD05102140	1kΩ
R309	1	RA05030090	Trimming 50kΩ
R310	1	GD05104140	100kΩ
R311	1	GD05392140	3.9kΩ
R312	1	GD05892140	3.9kΩ
R313	1	GD05103140	10kΩ
R314	1	GD05103140	10kΩ
R315	1	GD05103140	10kΩ
R316	1	GD05103140	10kΩ
R317	1	GD05391140	390Ω
R318	1	GD05391140	390Ω
R319	1	RA01030260	Trimming 10kΩ
R320	1	GD05102140	1kΩ
R321	1	GD05182140	1.8kΩ
R322	1	GD05182140	1.8kΩ
R323	1	GD05104140	100kΩ
R324	1	GD05104140	100kΩ
R325	1	GD05152140	1.5kΩ
R326	1	GG05470120	47Ω 1/2W
R327	1	GD05104140	100kΩ
R328	1	GD05682140	6.8kΩ
R329	1	GD05102140	1kΩ
R330	1	GD05102140	1kΩ
R331	1	GD05272140	2.7kΩ
R332	1	GD05104140	100kΩ
R333	1	GD05153140	15kΩ
R334	1	GD05223140	22kΩ
R335	1	GD05154140	150kΩ
R336	1	GD05104140	100kΩ
R337	1	GD05473140	47kΩ
R338	1	GD05473140	47kΩ
R339	1	GD05103140	10kΩ
R340	1	GD05473140	47kΩ
R341	1	GD05222140	2.2kΩ
R342	1	GD05474140	470kΩ
R343	1	GD05222140	2.2kΩ
R344	1	GD05223140	22kΩ
R346	1	GD05223140	22kΩ
R348	1	GD05105140	1MΩ
R349	1	GD05105140	1MΩ
R350	1	GD05104140	100kΩ
R351	1	GD05124140	120kΩ
R352	1	GD05472140	4.7kΩ
R353	1	GD05272140	2.7kΩ
R354	1	GD05472140	4.7kΩ
R355	1	GD05222140	2.2kΩ

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
R356	1	GD05152140	1.5kΩ
⚠R801	1	GA05561010	560Ω 1W
⚠R802	1	GJ05180020	18Ω 2W
R803	1	GG05561140	560Ω
R804	1	GA05561010	560Ω 1W
RA01	1	GD05221140	220Ω
RA02	1	GD05152140	1.5kΩ
RA04	1	GD05104140	100kΩ
RA05	1	GD05222140	2.2kΩ
RA06	1	GD05332140	3.3kΩ
RA08	1	GD05331140	330Ω
RA09	1	GD05103140	10kΩ
RA10	1	GD05103140	10kΩ
RA11	1	GD05152140	1.5kΩ
RA12	1	GD05473140	47kΩ
RA13	1	GD05221140	220Ω
RA14	1	GD05102140	1kΩ
RA15	1	GD05333140	33kΩ
RA16	1	GD05104140	100kΩ
			P100-SEMICONDUCTORS
Q101	1	HF400451B0	F.E.T. 3SK45(B)
Q102	1	HT310471C0	Transistor 2SC1047(C)
Q103	1	HT308291C0	Transistor 2SC829(C)
Q104	1	HF200551D0	F.E.T. 2SK55(D)
Q105	1	HD40012090	Varicap 1S2687
Q106	1	HD20001210	Diode 1S2473C
Q201	1	HT310471C0	Transistor 2SC1047(C)
Q202	1	HC10028030	IC LA1231N
Q203	1	HD20001210	Diode 1S2473C
Q204	1	HD20001210	Diode 1S2473C
Q205	1	HD20001210	Diode 1S2473C
Q206	1	HD20001210	Diode 1S2473C
Q207	1	HT309452B0	Transistor 2SC945(P,Q)
Q208	1	HT309452B0	Transistor 2SC945(P,Q)
Q209	1	HT107332A0	Transistor 2SA733(P,Q)
Q210	1	HT107332A0	Transistor 2SA733(P,Q)
Q211	1	HT309452B0	Transistor 2SC945(P,Q)
Q212	1	HT309452B0	Transistor 2SC945(P,Q)
Q301	1	HC10029010	IC HA11223W
Q302	1	HT309452B0	Transistor 2SC945(P,Q)
Q303	1	HT107502A0	Transistor 2SA750(E,F)
Q304	1	HT107502A0	Transistor 2SA750(E,F)
Q305	1	HT309452B0	Transistor 2SC945(P,Q)
Q306	1	HT309452B0	Transistor 2SC945(P,Q)
Q307	1	HD30033090	Zener WZ052
Q308	1	HD20001210	Diode 1S2473C
Q309	1	HT309452B0	Transistor 2SC945(P,Q)
Q310	1	HT309452B0	Transistor 2SC945(P,Q)
Q311	1	HT107332A0	Transistor 2SA733(P,Q)
Q312	1	HC10019020	IC AN6552
Q313	1	HD20001210	Diode 1S2473C
Q314	1	HT309452B0	Transistor 2SC945(P,Q)
Q315	1	HT304452B0	Transistor 2SC945(P,Q)
Q316	1	HF200301C0	F.E.T. 2SK30A(Y)
Q317	1	HD20001210	Diode 1S2473C
Q318	1	HD20001210	Diode 1S2473C
Q319	1	HT309452B0	Transistor 2SC945(P,Q)
Q320	1	HT309452B0	Transistor 2SC945(P,Q)
⚠Q801	1	HD20015030	Diode DS135(D)
⚠Q802	1	HD20015030	Diode DS135(D)

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
⚠Q803	1	HD20015030	Diode DS135(D)
⚠Q804	1	HD20015030	Diode DS135(D)
Q805	1	HD30025090	Zener WZ150
⚠Q806	1	HT403131D0	Transistor 2SD313(D)
Q807	1	HT30023090	Zener WZ071
QA01	1	HC10041030	IC LA1240
QA02	1	HT308291C0	Transistor 2SC829(C)
QA03	1	HV00006120	Varistor MV-203
QA04	1	HD20001210	Diode 1S2473C
QA05	1	HD20015030	Diode DS135D
			P100-FILTERS
F201	1	FF11070050	Ceramic FM C.F SFE 10.7MD1
F202	1	FF11070130	Ceramic FM C.F. SFE 10.7MS3G
F203	1	FF11070130	Ceramic FM C.F SFE 10.7MS3G
FA01	1	FF10045190	Ceramic AM C.F CFM 2-455BL
			P100-COILS
L101	1	LA12026170	Ant. Coil FM
L102	1	LL24800030	RF Coil FM
L103	1	LK11801030	RF Coil FM
L104	1	LK11801030	RF Coil FM
L105	1	LC17510010	Choke Coil 0.75μH
L106	1	LI10016010	I.F.T. FM
L107	1	LO12036010	OSC Coil FM
L201	1	LI14030020	I.F.T FM
L202	1	LS35040010	M.P.X. Coil
L203	1	LS10290190	M.P.X. Coil
LA02	1	LI10010720	I.F.T AM
LA03	1	LI10015060	I.F.T AM
LA04	1	LO10010480	IF TRAP
			P100-SWITCH
S101	1	SP02030140	Push Switch, Mode
			P100-MISCELLANEOUS
P111	2	75061001P0	Jumper 10mm
P809	2	2933118010	Spacer
			PB00-ANT. COIL CIRCUIT BOARD
PB00	1	WF406H0020	
	1	ZZ406H0020	P.W. Board, Ant. Coil P.W. Board Assembly
			PB00-COILS
LB01	1	LA10295010	Ant. Coil MW
LB02	1	LA10295020	Ant. Coil LW
LB04	1	LC11540040	Coil 150μH
			PC00-FREQUENCY INDICATOR SUB CIRCUIT BOARD
PC00	1	WK404H1420	P.W. Board, Frequency Indicator Sub
			PQ00-FREQUENCY INDICATOR CIRCUIT BOARD
PQ00	1	WK404H1410	P.W. Board, Frequency Indicator
	1	ZZ404H1410	P.W. Board Assembly

10. TECHNICAL SPECIFICATIONS

FM TUNER SECTION

Frequency Range	87.5 ~ 108 MHz
Usable Sensitivity 40 kHz Deviation, 98 MHz	
Mono S/N 26 dB	0.9 μV
Stereo S/N 46 dB	20 μV
Alternate Channel Selectivity 98 MHz	70 dB
Image Response Rejection, 98 MHz	70 dB
IF Rejection, 98 MHz	88 dB
Spurious Response Rejection, 98 MHz	90 dB
AM Suppression, 98 MHz	55 dB
Signal-to-Noise Ratio at 98 MHz	
Un-weighted Mono	73 dB
Stereo	65 dB
Weighted Mono	76 dB
Stereo	70 dB
Pilot Signal & Subcarrier Rejection	
19 kHz	65 dB
38 kHz	68 dB
Total Harmonic Distortion at 98 MHz	
Mono	0.17%
Stereo	0.2%
Frequency Response	
30 Hz ~ 15 kHz	+0/−1 dB
Separation	
Stereo	45 dB
Channel Balance	0.2 dB
Output Voltage, 1 kHz	700 mV
Output Impedance, 1 kHz	1.8k ohms
Acceptable Load Impedance, 1 kHz	47k ohms
Antenna Terminals	
Balanced	300 ohms
Unbalanced	75 ohms

MW TUNER SECTION

Frequency Range	531 ~ 1602 kHz
Usable Sensitivity (20 dB S/N 30% Mod., 1 MHz)	10 μV
Selectivity 1 MHz	35 dB
Image Rejection, 1 MHz	45 dB
IF Rejection, 1 MHz	45 dB
Signal-to-Noise Ratio, 1 MHz	55 dB
Total Harmonic Distortion, 1 MHz	0.3%

LW TUNER SECTION

Frequency Range	150 ~ 370 kHz
Usable Sensitivity (20 dB S/N, 30% Mod., 250 kHz)	90 μV
Image Rejection, 250 kHz	36 dB
IF Rejection, 250 kHz	65 dB
Signal-to-Noise Ratio, 250 kHz	50 dB

GENERAL

Power Requirements	220V AC, 50 Hz
	(E and N versions are featuring an external voltage selector for use on 110V. Other versions can be converted by a qualified technician to operate on 240V.)
Power Consumption	14W
Semiconductor Complement	
Integrated Circuits	7
Transistors	25
Diodes	24
Field Effect Transistors	3
Dimensions	
Panel Width	416 mm
Panel Height	73 mm
Depth	194 mm
Weight	
Unit Alone	3.2 kg

Specifications and appearance are subject to change for modification without notice.

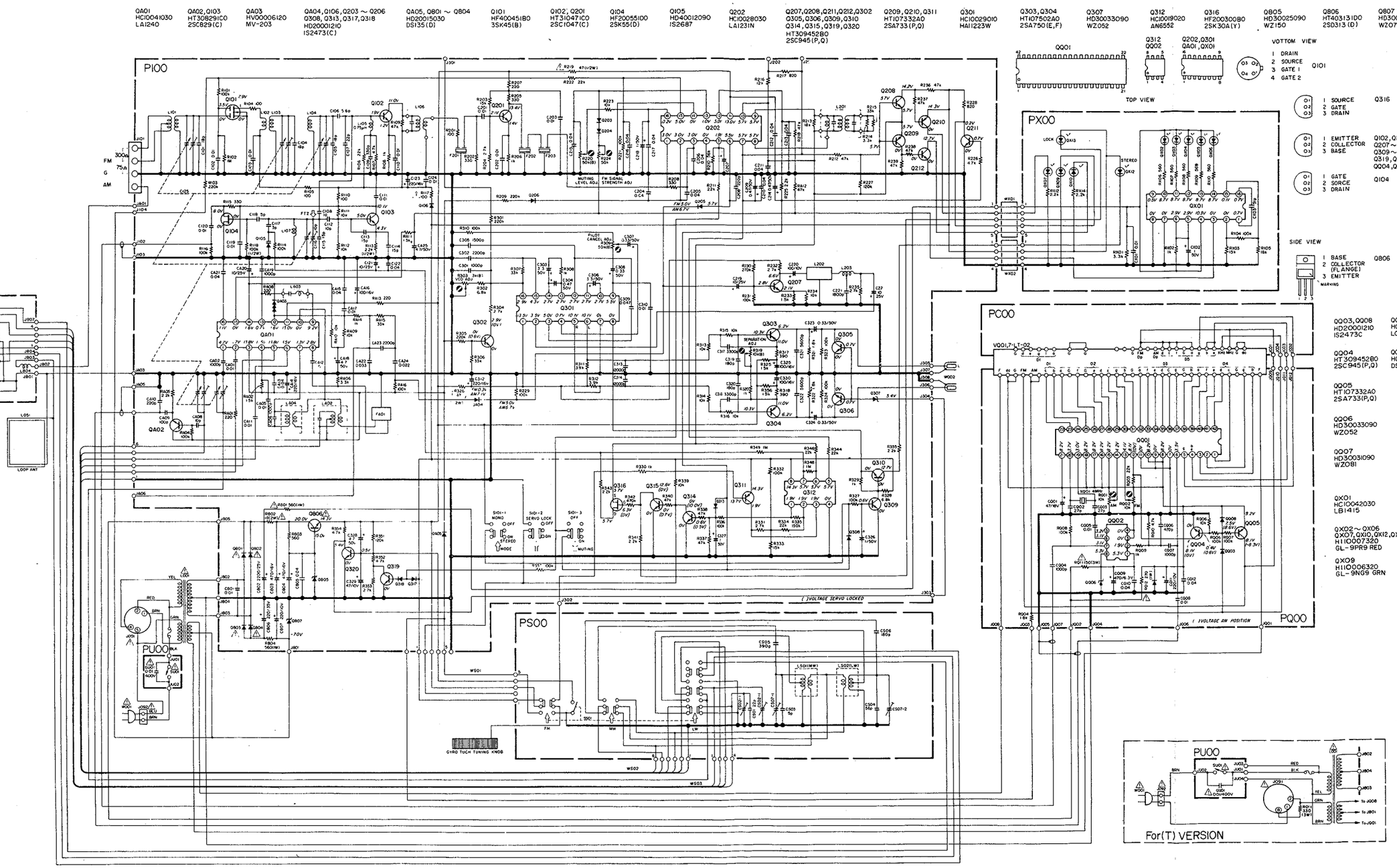
REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			PQ00-CAPACITORS
CQ01	1	EA47601030	Elect 47μF 10V
CQ02	1	DD15270300	Ceramic 27pF ±5%
CQ03	1	DD15270300	Ceramic 27pF ±5%
CQ04	1	DA17102010	Ceramic 1000pF ±20%
CQ05	1	DA17103010	Ceramic 0.01μF ±20%
CQ06	1	DA16471010	Ceramic 470pF ±10%
CQ07	1	DA17102010	Ceramic 1000pF ±20%
CQ08	1	DA17103010	Ceramic 0.01μF ±20%
CQ09	1	EA47700630	Elect 470μF 6.3V
CQ10	1	DK18403320	Ceramic 0.047μF
CQ11	1	EA22701030	Elect 220μF 10V
CQ12	1	DK18403320	Ceramic 0.04μF
			PQ00-RESISTORS
			(All Resistors are ±5% and 1/4W)
RQ01	1	RA01030260	Trimming 10kΩ
RQ02	1	RA01030260	Trimming 10kΩ
RQ03	1	GD05223140	22kΩ
RQ04	1	GD05182140	1.8kΩ
RQ05	1	GD05104140	100kΩ
RQ06	1	GD05103140	10kΩ
RQ07	1	GD05104140	100kΩ
RQ08	1	GD05104140	100kΩ
RQ09	1	GD05102140	1kΩ
RQ10	1	GD05472140	4.7kΩ
⚠RQ11	1	GA05151030	150Ω 3W
⚠RQ12	1	GA05271010	270Ω 1W
			PQ00-SEMICONDUCTORS
QQ01	1	HC10043030	IC LC7258
QQ02	1	HC10004360	IC DS8629
QQ03	1	HD20001210	Diode 1S2473C
QQ04	1	HT309452B0	Transistor 2SC945(P,Q)
QQ05	1	HT107332A0	Transistor 2SA733(P,Q)
QQ06	1	HD30033090	Zener WZ052
QQ07	1	HD30031090	Zener WZ081
QQ08	1	HD20001210	Diode 1S2473C
VQ01	1	HQ30502410	Display Unit 7-LT-02
			PQ00-CRYSTAL
XQ01	1	XB107001L0	Crystal 4MHz
			PQ00-JUMPERS
PC11	1	75061001P0	Jumper 10mm
PQ11	1	75061001P0	Jumper 10mm
			PS00-SWITCH CIRCUIT BOARD
PS00	1	WF406H0010	P.W. Board, Switch
	1	ZZ406H0010	P.W. Board Assembly
			PS00-CAPACITORS
CS01	1	DD15220370	Ceramic 22pF ±5%
CS02	1	CT21600010	Trimming Ant. Trimmer
CS03	1	DD11050400	Ceramic 5pF ±0.5pF
CS04	1	DD15560360	Ceramic 56pF ±5%
CS05	1	DF55391090	Film 390pF ±5%
CS06	1	DF55181090	Film 180pF ±5%
CS07	1	CT21600010	Trimming OSC Trimmer

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			PS00-COILS
LS01	1	LO10010480	OSC Coil MW
LS02	1	LO10010570	OSC Coil LW
			PS00-SWITCH
SS01	1	SP06030190	Push Switch, Function
			PS00-JUMPERS
WS01	1	YU05060260	Jumper Lead, 160mm
WS02	1	YU06060260	Jumper Lead, 60mm
WS03	1	YU04140260	Jumper Laed, 160mm
			PU00-POWER SWITCH CIRCUIT BOARD
PU00	1	WK404H1440	P.W. Board, Power Switch
	1	ZZ404H8440	P.W. Board Assembly
⚠GU01	1	DK18103840	Ceramic 0.01μF
⚠SU01	1	SP01010390	Push Switch, Power
			PX00-LED INDICATOR CIRCUIT BOARD
PX00	1	WK404H1430	P.W. Board, Led Indicator
	1	ZZ404H1430	P.W. Board Assembly
			PX00-CAPACITORS
CX01	1	DA17103010	Ceramic 0.01μF ±20%
CX02	1	EJ10505010	Elect 1μF 50V
CX03	1	DA15510010	Ceramic 51pF ±5%
			PX00-RESISTORS
			(All Resistors are ±5% and 1/4W)
RX01	1	GD05332140	3.3kΩ
RX02	1	GD05102140	1kΩ
RX03	1	GD05153140	15kΩ
RX04	1	GD05104140	100kΩ
RX05	1	GD05183140	18kΩ
RX06	1	GD05561140	560Ω
RX07	1	GD05561140	560Ω
RX08	1	GD05561140	560Ω
RX09	1	GD05561140	560Ω
RX10	1	GD05561140	560Ω
RX12	1	GD05222140	2.2kΩ
RX14	1	GD05222140	2.2kΩ
			PX00-SEMICONDUCTORS
QX01	1	HC10042030	IC LB1415
QX02	1	HI10007320	L.E.D GL-9PR9
QX03	1	HI10007320	L.E.D GL-9PR9
QX04	1	HI10007320	L.E.D GL-9PR9
QX05	1	HI10007320	L.E.D GL-9PR9
QX06	1	HI10007320	L.E.D GL-9PR9
QX07	1	HI10007320	L.E.D GL-9PR9
QX09	1	HI10006320	L.E.D GL-9NG9
QX10	1	HI10007320	L.E.D GL-9PR9
QX12	1	HI10007320	L.E.D GL-9PR9
QX13	1	HI10007320	L.E.D GL-9PR9

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			PX00-JUMPERS
WX01	1	YU05160260	Jumper Lead 160mm
WX02	1	YU04160260	Jumper Lead 160mm

W01-99	Assembly and Wring
T01-99	Adjustment
X01-00	Correction

11. SCHEMATIC DIAGRAMS



Components and wiring are subject to change for modification without notice.

NOTE ON SAFETY:
The parts marked with ⚠ are important parts on the safety. Please use the parts having the designated parts numbers without fail.